REMARKS

Applicants appreciate the thorough examination of the present application as evidenced by the Office Action. Applicants submit that the present rejections should be withdrawn for at least the reasons discussed below.

The Claims Are Not Anticipated

Claims 1-3, 7, 8, 10, 11, 14-16, 20, 21 and 23 stand rejected under 35 U.S.C. § 102(b) as anticipated by United States Patent No. 5,677,226 to Ishitani (hereinafter "Ishitani"). Official Action, p. 2. Claims 1, 12, 13, 24, 25 and 27-30 stand rejected under 35 U.S.C. § 102(b) as anticipated by United States Patent No. 5,843,818 to Joo et al (hereinafter "Joo"). Official Action, p. 3.

Under 35 U.S.C. § 102, "a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." M.P.E.P. § 2131 (quoting *Verdegaal Bros. v. Union Oil Co.*, 814 F.2d 628, 631, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987)). "The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.'" M.P.E.P. § 2112 (citations omitted) (emphasis added).

A finding of anticipation further requires that there must be no difference between the claimed invention and the disclosure of the cited reference as viewed by one of ordinary skill in the art. *See Scripps Clinic & Research Foundation v. Genentech Inc.*, 18 U.S.P.Q.2d 1001 (Fed. Cir. 1991). Thus, anticipation requires that a single prior art reference disclose each and every element of the anticipated claim.

In rejecting Claim 1 over Ishitani, the Office Action asserts, among other things, that the silicon nitride film 4 on the polycrystalline silicon film lower electrode 3 discloses the

nitride protection layer of Claim 1. Office Action, p.2; Ishitani, Col. 4, lines 15-19. However, Claim 1 recites that the protection layer is formed "on the lower electrode at a temperature below a minimum temperature associated with a phase change of the lower electrode." Nothing in Ishitani expressly states whether its silicon nitride film 4 is processed at a temperature that is not associated with a phase change of the lower electrode 3. In fact, Ishitani states that the silicon nitride film 4 is formed in "an atmosphere of ammonia at 850° for 60 seconds." Ishitani, Col. 4, line 59 to Col. 5, line 5. As stated in the present application, a temperature of above 600°C is associated with a phase change in silicon. Specification, p. 7, lines 17-19. Accordingly, the disclosed treatment of Ishitari also does not inherently disclose these recitations. Independent Claims 14 and 24 contain corresponding recitations. Therefore, Applicants request withdrawal of the anticipation rejections of Claims 1, 14, 24 and various of the claims depending therefrom for at least these reasons.

Independent Claims 1 and 24 also stand rejected as anticipated by Joo. Claim 1 has been amended above to recite that the protection layer is a nitride layer. Corresponding amendments have been made to independent Claims 14 and 24. In rejecting Claim 1 over Joo, the Office Action asserts, among other things, the barrier metal layer 25 of Joo discloses the lower electrode ("first conductive layer") and the oxidation-resistant conductive material layer 27 of Joo discloses the protection layer ("reaction-preventing layer") of Claim 1. As stated in Joo:

> The barrier metal layer 25 is formed to prevent migration of silicon in the plug 19 into an oxidation-resistant conductive material layer formed in the contact hole. For example, silicidation occurs at the contact between platinum and polysilicon. Thus, silicidation could occur where a platinum layer contacts the polysilicon plug 19 of the substrate 10. Silicidation at the contact point may cause silicon to diffuse into the platinum which may affect a dielectric layer formed on the platinum. **Therefore, a barrier metal layer is formed to suppress silicidation of an electrode material. A metal nitride such as titanium nitride (TiN) may be used as a barrier metal.** (Emphasis added.)

Joo, Col. 5, lines 1-11. Thus, the barrier metal layer 25 in Joo is actually described as a barrier layer (for silicon rather than oxygen as recited for the protection layer in Claim 1), rather than as the conductive layer. Instead, the oxidation-resistant conductive material layer 27 is described as the conductive layer of the electrode. As stated in Joo, the

"oxidation-resistant conductive material layer 27 may be formed of an oxidation-resistant noble metal such as platinum." Joo, Col. 5, lines 15-17.

As such, Joo describes a structure with a dielectric formed on a conductive noble metal layer, which is formed on a metal nitride layer. The nitride layer of Joo is not between the dielectric layer and the conductive noble metal layer and clearly cannot limit oxidation of the conductive metal layer. Independent Claim 24 is patentable over Joo for substantially the same reasons. Accordingly, Applicants request withdrawal of the anticipation rejections based on Joo of independent Claims 1 and 24 and the claims depending therefrom for at least these reasons.

The Claims are not Obvious:

To establish a *prima facie* case of obviousness, the prior art reference or references when combined must teach or suggest *all* the recitations of the claims, and there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. *See* M.P.E.P. § 2143. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *See* M.P.E.P. § 2143.01(citing *In re Mills* , 916 F.2d 680, 16 U.S.P.Q.2d 1430 (Fed. Cir. 1990)). As emphasized by the Court of Appeals for the Federal Circuit, to support combining references, evidence of a suggestion, teaching, or motivation to combine must be **clear and particular**, and this requirement for clear and particular evidence is not met by broad and conclusory statements about the teachings of references. *In re Dembiczak*, 50 U.S.P.Q.2d 1614, 1617 (Fed. Cir. 1999). In another decision, the Court of Appeals for the Federal Circuit has stated that, to support combining or modifying references, there must be **particular** evidence from the prior art as to the reason the skilled artis an, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed. *In re Kotzab*, 55 U.S.P.Q.2d 1313, 1317 (Fed. Cir. 2000).

Furthermore, as recently stated by the Federal Circuit with regard to the selection and

combination of references:

> This factual question of motivation is material to patentability, and could not be resolved on subjective belief and unknown authority. It is improper, in determining whether a person of ordinary skill would have been led to this combination of references, simply to "[use] that which the inventor taught against its teacher." W.L. Gore v. Garlock, Inc., 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed. Cir. 1983). Thus the Board must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the agency's conclusion....

In re Sang Su Lee, 277 F.3d 1338, 1343 (Fed. Cir. 2002). Applicants submit that the Official Action has failed to establish a *prima facie* case of obviousness for the reasons discussed below.

Claims 5 and 18 stand rejected as obvious under 35 U.S.C. § 103 over Ishitani in view of Silicon Processing for the VLSI Era - Vol. 1: Process Technology ("Wolf"). Official Action, pp. 4-5. The Office Action asserts that Wolf teaches processing a silicon nitride layer at a "temperature of about 600°C or less using a plasma-enhanced chemical vapor deposition." Office Action, p. 5. The Office Action further asserts that one of skill in the art would combine Ishitani with Wolf "since the silicon nitride layer [of Wolf] is conformal and, thereby, conforms to the lower electrode's contoured shape." While agreeing that Wolf does discuss both a lower and a higher temperature silicon nitride deposition process, Applicants submit that Wolf actually teaches away from the combination relied on in the rejection.

Wolf states that the lower temperature process as used where the "deposition process must be compatible with such low-melting point metals as aluminum." Wolf, p. 192. Otherwise, the comparison of the two processes in Wolf clearly indicates that the higher temperature process includes many benefits, such as "excellent step coverage and relatively low particular contamination." Wolf, p. 193. Difficulties with the lower temperature PECVD process are also discussed, such as the introduction of oxygen, as "[o]xygen concentration increases as deposition temperature decreases ... due to moisture or oxygen released from the reaction chamber walls." Wolf, p. 194. Therefore, contrary to the assertion of the Office Action, one of skill in the art would not be motivated to use the lower temperature process of Wolf, in the context of Ishitani, as there is no concern with compatibility with a low melting

point metal. Accordingly, Claims 5 and 8 are also separately patentable for at least these additional reasons as well as based on their dependence form Claim 1, the patentability of which was discussed previously.

Claims 4, 6, 17 and 19 stand rejected as obvious under 35 U.S.C. § 103 over Ishitani in view of US2003/0134486 to Wang ("Wang"). Applicants submit that each of these claims is patentable at least based on the patentability of the independent claims from which they depend as discussed above. Furthermore, Wang describes "nitridizing at least a portion of an outer surface of silicon of a device wafer." Wang, Abstract. As such, there is no motivation to look to Wang for defining a process for use in forming a protective layer in a capacitor structure. Therefore, there is no motivation to combine Wang with Ishitani in the manner relied on in the Office Action. Accordingly, Claims 4, 6, 17 and 19 are also separately patentable for at least these reasons in addition to being patentable based on the patentability of the independent claims from which they depend.

Claims 9 and 22 stand rejected as obvious under 35 U.S.C. § 103 over Ishitani in view of Joo. Applicants submit that each of these claims is patentable at least based on the patentability of the independent claims from which they depend as discussed above.

Claim 26 stands rejected as obvious under 35 U.S.C. § 103 over Joo in view of United States Patent No. 5,504,041 to Summerfelt ("Summerfelt"). Applicants submit that each of these claims is patentable at least based on the patentability of the independent claims from which they depend as discussed above. Furthermore, Applicants submit that the even if combined, Summerfelt and Joo would not disclose the recitations of Claim 26. In particular, while Summerfelt does describe a process for forming a platinum layer 36 on a barrier layer 34, like Joo, this is not pertinent to the formation of the nitride protection layer of Claim 26 and Claim 24 on which it depends. The barrier metal layer 25 of Joo is used to "prevent migration of silicon in the plug 19 into an oxidation-resistant conductive material layer [27]" and is positioned between the conductive layer 27 and an underlying plug 19, not a dielectric layer. Joo, Col. 5, lines 1-3. The layer 27 relied on as the reaction-preventing layer in the rejection is not even described as anything other than a conductive layer defining a lower electrode of a capacitor. Thus, regardless of how the layer 27 could be formed if combined

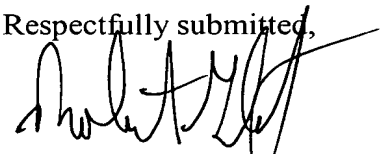
with Summerfelt, it discloses nothing about the formation of the reaction-preventing layer of Claims 24/26. Claim 26 is, therefore, separately patentable for at least these reasons.

Newly added dependent Claim 31 is patentable at least based on the patentability of Claim 1 from which it depends. In addition, Claim 31 further recites that the nitride protection layer is "an electrically non-conductive layer." As such is not the case for the layers 25, 27 of Joo relied on in the rejections of Claim 1, Claim 31 is also separately patentable over Joo in light of these recitations. Newly added independent Claim 32 corresponds to originally presented Claim 1, with the addition of the recitation that the protection layer is "an electrically non-conductive protection layer." Accordingly, Claim 32 is patentable over Ishitani for at least the reasons discussed with reference to Claim 1 above and over Joo for at least the reasons discussed with reference to Claim 31.

CONCLUSION

Applicants respectfully submit that, for the reasons discussed above, the references cited in the present rejections do not disclose or suggest the present invention as claimed. Accordingly, Applicants respectfully request allowance of all the pending claims and passing this application to issue.

Respectfully submitted,



Robert W. Glatz
Registration No. 36,811

Myers Bigel Sibley & Sajovec
P.O. Box 37428
Raleigh, NC 27627
(919) 854-1400 phone
(919) 854-1401 fax

Certificate of Mailing under 37 CFR 1.8

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, PO Box 1450, Alexandria, VA 22313-1450 on September 2, 2004.

Carey Gregory

382396